# 6.0 Aviation Forecasts

## 6.0 AVIATION FORECASTS

The purpose of this section is to determine the level of based aircraft and operational activity which is expected to occur over the next 20 years at Avi Suquilla Airport. This is accomplished by developing a set of aviation forecasts to serve as the foundation for determining future requirements and proposed improvements at the Airport.

In general, forecasting aviation demand is accomplished by projecting demonstrated past trends in aviation activity using a variety of statistical techniques. These projections are normally made by identifying a mathematical relationship which most closely approximates the historical behavior of some observable phenomenon and by extending this relationship into the future. The forecasts contained in this section rely primarily on existing forecasts of aviation activity for the Parker area as found in FAA Activity Forecasts 1983 through 1994, and socio-economic projections for La Paz, Yuma, and Mohave Counties. Other local and regional characteristics considered include an analysis of area airports and the touristic/seasonal traits of the Parker area.

### 6.1 FORECAST ASSUMPTIONS

The subjective side of forecasting requires an awareness of the many variables which affect the aviation industry. For example, the nation's economic recession during the late 1970's and early 1980's has diminished the purchasing power of the average consumer. Consequently, the expected rate of growth in discretionary purchases, such as general aviation aircraft ownership, is not expected to be as high as it has been in previous years. However, increased economic pressure on corporate profits has improved the potential for increases in business and corporate ownership of general aviation aircraft. Private general aviation aircraft ownership is expected to rebound with the anticipated recovery of the economy; however, aviation growth rates are expected to be considerably lower than those experienced in years past. Additionally, the threat of petroleum product shortages in recent years has

caused an associated increase in the price of aviation fuels, and although prices have leveled and shortages have disappeared, recovery is expected to be sluggish as the overall cost of owning and operating general aviation aircraft remains substantially greater than a decade ago.

To more clearly define the parameters on which these forecasts are based, the following assumptions were made:

- Aviation fuel is expected to remain available throughout the 20-year period, and it is assumed that the price of fuel and the overall cost of operating aircraft will continue to increase over the forecast period.
- The overall economy will continue to adversely affect private aircraft ownership and the level of operations in general; however, the touristic nature of the Parker area is expected to override some of these negative effects.
- The socioeconomic characteristics for La Paz, Yuma, and Mohave Counties and the FAA Western Region will continue to have the same relationship to projected national socioeconomic statistics in future years.
- In general, the overall rate of increase for aircraft basing and operational activity will remain consistent with projections stated in FAA regional forecasts, although some seasonal fluctuation may be expected due to the touristic characteristics of the area.

In addition to these assumptions, three other factors bear consideration which may affect the finalization of forecasts for facilities planning purposes:

1. The relative accuracy of the forecast; as a general rule, confidence levels (anticipated forecast accuracy) tend to

become less acceptable as the forecast proceeds beyond 5 or more years.

2. The level of optimism placed in a forecast may have a direct bearing on facility design. That is, facilities that have been planned and constructed in conjunction with a conservative forecast could become extremely overcrowded during the forecast period, while facilities that have been planned in conjunction with an optimistic forecast could become an economic burden to an airport because the anticipated revenues failed to materialize. Consequently, a tolerance for forecast deviation should be incorporated in any facility planning exercise.
3. Because a general aviation airport represents a major public facility, it should be evaluated in relation to the population and economic growth of the area it serves. Variations and trends in socioeconomic characteristics and touristic activity can serve as important indicators of the need to expand or improve aviation facilities.

## 6.2 AREA AIRPORT CAPACITIES

Three other area airports (Lake Havasu Airport, Needles Airport, and the proposed Chemehuevi Valley Airport) were examined to determine the area's total capacity for based aircraft.

### 6.2.1 Lake Havasu Airport

Located approximately 23 miles north-northwest of Avi Suquilla Airport, Lake Havasu Airport accommodates an average of 40 based aircraft. However, interviews with airport management indicate that this figure typically doubles on the weekends to approximately 80 aircraft due to an influx of itinerant pleasure flyers. Existing facilities at Lake Havasu

Airport will accommodate up to 198 aircraft. Consequently, the airport is presently operating at 20 to 40 percent of its basing capacity.

### 6.2.2 Needles Airport

Needles Airport is located approximately 47 statute miles to the northwest of Avi Suquilla Airport and is capable of accommodating 40 based aircraft. According to airport management, 25 aircraft are currently based at the Airport, representing 63 percent of the Airport's basing capacity.

### 6.2.3 Proposed Chemehuevi Valley Airport

Chemehuevi Valley Airport, when constructed, will be located on the west side of the Colorado River just across from the Lake Havasu Airport, or approximately 25 statute miles to the northwest of Avi Suquilla Airport. An examination of the site selection study for the proposed new Airport indicated a basing requirement for 75 aircraft by the year 2005. Like most airports located along the Colorado River, it is anticipated that the proposed airport will also experience a high degree of fluctuation in aircraft parking demand due to seasonal and touristic effects. For purposes of this analysis, it is assumed that the construction of the proposed Chemehuevi Valley Airport is imminent and that the airport will experience near capacity conditions in terms of seasonal aircraft parking requirements.

In summary, each existing and proposed area airport examined showed sufficient capacity in meeting the area's based aircraft parking requirements; however, overall parking capacities (based and itinerant) will continue to be tested during weekends and vacation seasons. Actual accounts of aircraft parking demand at existing airports indicated that during peak periods, parking demand may increase from 100 to 350 percent over typical based aircraft parking demand depending upon the airport's location.

## 6.3 BASED AIRCRAFT FORECAST

Projections of based aircraft at Avi Suquilla Airport were developed using market share and regression analysis techniques.

The market share technique entails the use of FAA forecasts of active general aviation aircraft in the western region of the United States. Based on the area's socioeconomic characteristics, it was determined that the Airport's share of the based aircraft market would grow at a rate similar to that of the growth rate projected for the FAA Western Region. Table 6-1 exhibits the market share relationship between active general aviation aircraft in the U.S. and the FAA Western Region, and projected based aircraft for Avi Suquilla Airport. Using the market share technique, as many as 97 aircraft could be based at the Airport by the year 2005.

For comparison, multiple regression analyses were performed using growth rate projections for various socioeconomic elements such as population, income, retail sales, new housing permits, and the consumer price index. Table 6-2 presents a summary of each regression along with its corresponding based aircraft projection. As shown, the results of the regression analyses indicated that a range of 69 to 83 aircraft could be based at the Airport in 2005.

The final method for estimating aircraft basing demand compared the historical relationship between population statistics for the Town of Parker and the number of based aircraft of Avi Suquilla Airport. Based on these historical relationships, this method indicated that one aircraft was based at the Airport for every 80.3 Parker residents in 1984, and that one aircraft for every 83.5 resident may be expected in the year 2005. Table 6-3 summarizes these relationships.

To arrive at a final preferred planning forecast of based aircraft, each of the aforementioned methods of forecasting were combined and averaged. The averaging method was deemed reasonable because the combination of methods provides for economic and socioeconomic changes which may affect the level of based aircraft, whether or not these changes are

Table 6-1. Active General Aviation Percentages and Based Aircraft Projections - Market Share

| Year | Total Active GA Aircraft in U.S.[1] (000) | Total GA Aircraft Western Region[1] (000) | Percent Region of U.S.[2] | Based Aircraft Avi Suquilla[2] | Avi Suquilla Percent of Region[2] | Avi Suquilla Percent of U.S.[2] |
|---|---|---|---|---|---|---|
| Historical | | | | | | |
| 1980 | 210.3 | 35.3 | 16.8 | 29 | 0.082 | 0.014 |
| 1981 | 211.0 | 35.4 | 16.8 | 30 | 0.085 | 0.014 |
| 1982 | 213.2 | 36.7 | 17.2 | 31 | 0.084 | 0.015 |
| 1983 | 209.8 | 34.4 | 16.4 | 32 | 0.093 | 0.015 |
| 1984 | 207.0 | 35.7 | 17.2 | 33 | 0.092 | 0.016 |
| 1985 | 214.5 | 36.3 | 16.9 | 34 | 0.094 | 0.016 |
| Forecast | | | | | | |
| 1990 | 251.5 | 43.3 | 17.2 | 45 | 0.104 | 0.018 |
| 1995 | 288.5 | 49.4 | 17.1 | 52 | 0.104 | 0.018 |
| 2005 | 362.6 | 61.6 | 17.0 | 65 | 0.104 | 0.018 |

Sources: [1]FAA Aviation Forecasts, 1984.
[2] RS&H, 1985.
[3]Arizona State System Plan, Airport Management.

Table 6-2. Summary of Regression Analyses - Based Aircraft

| Year | Parker Population and Yuma County Population to Based Aircraft | Taxable Sales and Building Permits to Based Aircraft | Per Household Income and CPI to Based Aircraft | Yuma County, La Paz County and Arizona Population to Based Aircraft |
|---|---|---|---|---|
| Historical | | | | |
| 1970 | 19 | 19 | 19 | 19 |
| 1980 | 29 | 29 | 29 | 29 |
| 1984 | 34 | 34 | 34 | 34 |
| Forecast | | | | |
| 1990 | 38 | 40 | 39 | 38 |
| 1995 | 40 | 47 | 44 | 43 |
| 2005 | 46 | 60 | 54 | 51 |

Sources: RS&H, 1985.
Bureau of the Census, 1984.

Table 6-3. Parker Population Per Based Aircraft

| Year | Population Statistics | Avi Suquilla Based Aircraft | Population Per Based Aircraft |
|---|---|---|---|
| Historical | | | |
| 1970 | 2,016 | 19 | 106.1 |
| 1980 | 2,492 | 29 | 85.9 |
| 1984 | 2,730 | 34 | 80.3 |
| Forecast | | | |
| 1990 | 2,969 | 39 | 76.1 |
| 1995 | 3,207 | 43 | 74.6 |
| 2005 | 3,683 | 51 | 72.2 |

Source: RS&H, 1985.

identifiable and/or explainable. Table 6-4 exhibits the preferred planning forecast for the planning period.

## 6.4 BASED AIRCRAFT FLEET MIX

Another methodology used to determine airport basing requirements involves an analysis by type of based aircraft. As shown in Table 6-5, all categories of based aircraft are expected to increase during the planning period; however, the ratio of each category of based aircraft to the others is expected to approximate more closely the national ratios of active general aviation aircraft in future years. For example, the percentage of multi-engine aircraft to total based aircraft at Avi Suquilla Airport is somewhat lower than the national figures; therefore, the percentage of multi-engine aircraft relative to total based aircraft is expected to increase over the forecast period.

## 6.5 OPERATIONS FORECAST

The level of annual operations at Avi Suquilla Airport may be described as the sum of activity expected to be generated by local and itinerant operations (which would include air taxi operations). Each of these operational components were analyzed individually and then combined to determine total annual operations for each of the forecast years.

### 6.5.1 Itinerant Operations

Itinerant operations were determined based on results of FAA surveys at nontowered general aviation airports across the nation (AC 150/5300-4B). As shown in Figure 6-1, the median number of annual itinerant operations at nontowered airports is approximately 220, with an average of 275 operations. Since the Parker area has been described as touristic, it is reasonable to assume that the number of annual itinerant operations is presently greater than the national average. Therefore, it was estimated that approximately 349 annual itinerant operations per based aircraft are presently being experienced at Avi Suquilla Airport. However, since the Parker area supports a vacation atmosphere which draws actively from surrounding population centers having higher growth

Table 6-4. Preferred Planning Forecast - Based Aircraft

| Year | Market Share | Regression Analyses (averaged) | Population Per Based Aircraft | Preferred Planning Forecast |
|---|---|---|---|---|
| 1990 | 45 | 39 | 39 | 41 |
| 1995 | 52 | 44 | 43 | 46 |
| 2005 | 65 | 53 | 51 | 56 |

Source: RS&H, 1985.

Table 6-5. Preferred Forecast of Based Aircraft by Type*—Avi Suquilla Airport

| Year | ASA Single Engine | Percent Total Mix | ASA Multi-Engine | Percent Total Mix | ASA Turbo-Prop | Percent Total Mix | ASA Jet | Percent Total Mix | ASA Rotorcraft | Percent Total Mix | Total Based Aircraft |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Historical[1] | | | | | | | | | | | |
| 1970[4] | — | — | — | — | — | — | — | — | — | — | 19† |
| 1980[3] | — | — | — | — | — | — | — | — | — | — | 29† |
| 1984 | 30 | 90.2 | 3 | 7.5 | 0 | 0.0 | 0 | 0.0 | 1 | 2.3 | 34 |
| Forecast[2] | | | | | | | | | | | |
| 1990 | 36 | 87.8 | 3 | 7.3 | 1 | 2.4 | 0 | 0.0 | 1 | 2.5 | 41 |
| 1995 | 38 | 82.6 | 3 | 6.5 | 2 | 4.3 | 1 | 2.2 | 2 | 4.4 | 46 |
| 2005 | 45 | 80.4 | 4 | 7.1 | 3 | 5.4 | 2 | 3.5 | 2 | 3.6 | 56 |

* Forecast increases and decreases by aircraft type are based on projections contained in FAA Activity Forecasts, 1984.
† Estimated

Sources: [1] Airport Management Estimates
[2] RS&H, 1985.
[3&4] Information regarding based aircraft fleet mix unavailable for years indicated.

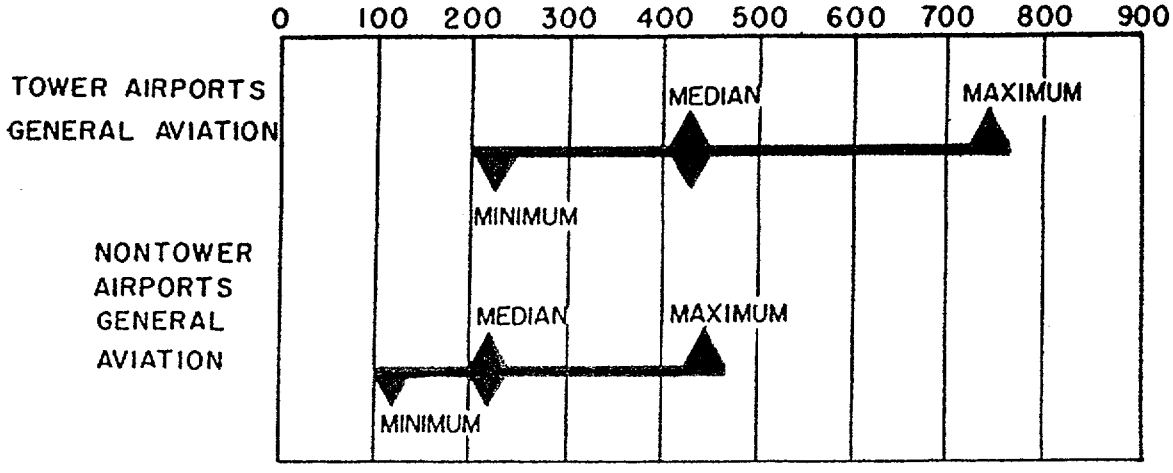


Figure 6-1
NUMBER OF ITINERANT GENERAL AVIATION OPERATIONS PER BASED AIRCRAFT

SOURCE: FAA ADVISORY CIRCULAR 150/5300-4B

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AIRPORT MASTER PLAN

rates, the proportion of itinerant operations to based aircraft is expected to increase from the 349 itinerant operations per based aircraft experienced presently to as many as 383 itinerant operations per based aircraft in the year 2005, which represents the high end of the range at nontowered airports as shown in Figure 6-1.

### 6.5.2 LOCAL OPERATIONS

Because of the proximity of the Airport to Lake Havasu Airport, numerous similarities exist with regard to location, population, and touristic characteristics. Likewise, the local operating characteristics for each airport was also assumed to be similar. In 1984, the percentage of local operations to total operations at Lake Havasu Airport equaled approximately 40 percent. Estimates of the local/itinerant mix at Avi Suquilla Airport indicated that 43 percent of total operations are local, which is consistent with the operating characteristics of the area. By applying this percentage to the forecast of operations, as many as 13,950 local operations may be expected by the year 2005.

### 6.5.3 Total Operations

Each of the major generators of aviation activity were analyzed and combined to formulate the total projected operational demand for the planning period. Table 6-6 and Figure 6-2 compare the projected levels of operations contributed by each of the generators of aviation activity and the total annual operations projected for each forecast year. For purposes of this analysis, air taxi operations are included as part of the general aviation component.

### 6.5.4 Operational Fleet Mix

The projected operational fleet mix for the Avi Suquilla Airport was developed based on estimated active general aviation aircraft relationships for the western pacific region as found in FAA Activity Forecasts for fiscal years (FY) 1984-1995. Table 6-7 delineates the projection of aircraft, by type, expected to use Avi Suquilla Airport during the planning period. As shown, the majority of aircraft are

Table 6-6. Projected Total Operations--Avi Suquilla Airport

| Year | Itinerant Operations | Percent of Total | Local Operation | Percent of Total | Total Operations |
|---|---|---|---|---|---|
| Historical | | | | | |
| 1970 | 6,190 | 55.0 | 5,065 | 45.0 | 11,255 |
| 1980 | 9,950 | 56.4 | 7,700 | 43.6 | 17,650 |
| 1984 | 11,870 | 57.0 | 8,955 | 43.0 | 20,825 |
| Forecast | | | | | |
| 1990 | 14,720 | 57.7 | 10,790 | 42.3 | 25,510 |
| 1995 | 16,880 | 58.7 | 11,875 | 41.3 | 28,755 |
| 2005 | 21,450 | 60.6 | 13,950 | 39.4 | 35,400 |

Sources: FAA Aviation Forecasts, FY 1984-1995.
RS&H, 1985.

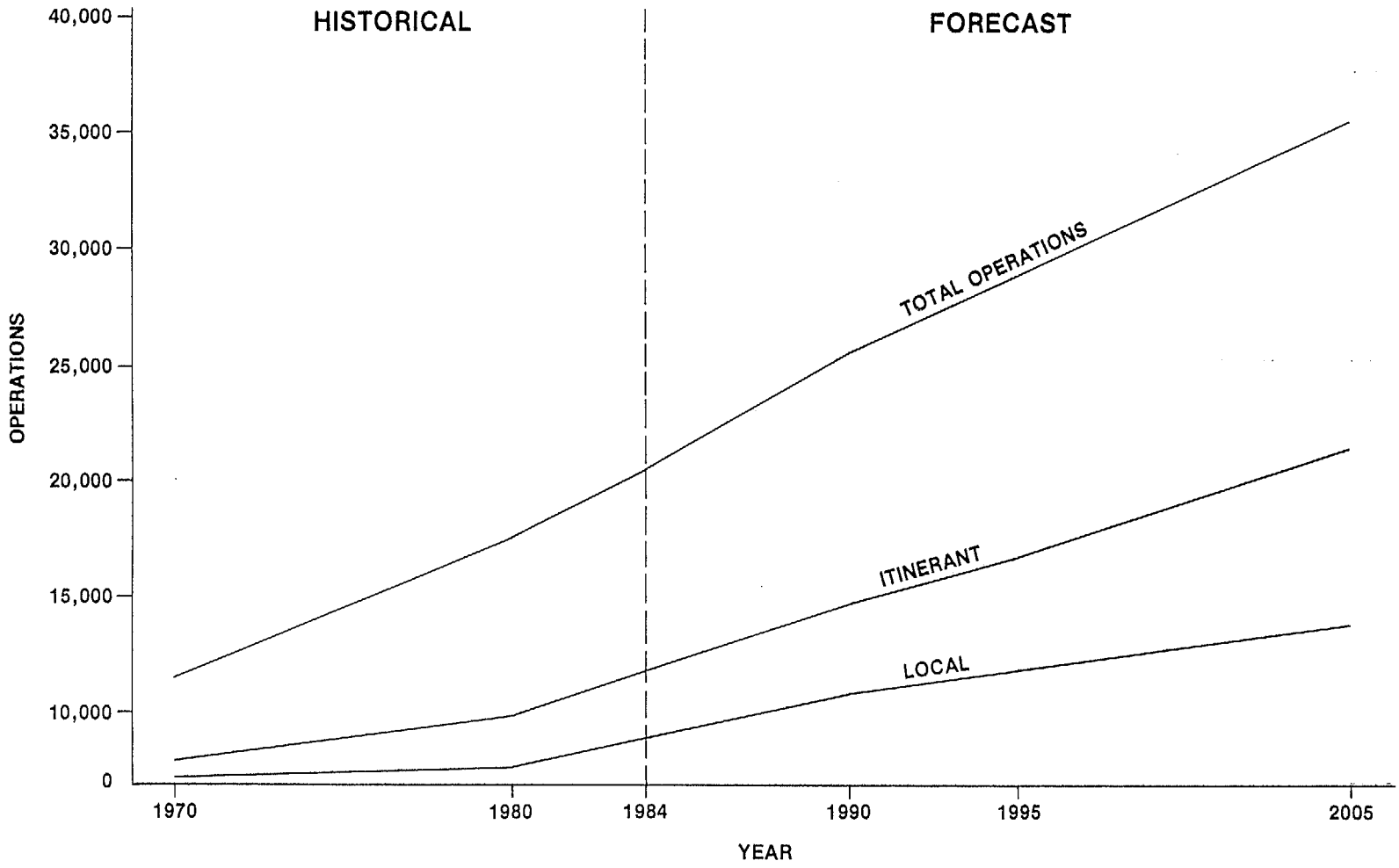


Figure 6-2
OPERATIONS FORECAST SUMMARY

SOURCE: FAA ACTIVITY FORECAST FISCAL YEARS, 1984-1995
RS&H, 1985

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Table 6-7. Airport Operational Fleet Mix--Avi Suquilla Airport

| Year | Fixed Wing | | | | Rotorcraft | Total |
|---|---|---|---|---|---|---|
| | Piston | | Turbine | | | |
| | Percent Single-Engine | Percent Multi-Engine | Percent Turbo Prop | Percent Turbo Jet | Percent Piston/ Turbine | |
| 1990 | 84.7 | 15.1 | 0.1 | 0.0 | 0.1 | 100.0 |
| 1995 | 85.1 | 14.6 | 0.1 | 0.1 | 0.1 | 100.0 |
| 2005 | 85.5 | 14.2 | 0.1 | 0.1 | 0.1 | 100.0 |

Sources: FAA Aviation Forecasts, FY 1984-1995.
RS&H, 1985.

expected to be single-engine and light twin-engine aircraft. Approximately 0.1 percent are projected to be turbine-powered aircraft; however, it is anticipated that the presence in significant numbers of turbine-powered aircraft will not occur until later in the forecast period.

### 6.5.5 Busy-Hour Activity

Busy-hour activity indicates an airport's ability to accommodate demand and represents the high level of activity expected to occur with reasonable frequency. FAA defines the theoretical "busy-hour operations" as the total number of aircraft operations expected to occur at an airport averaged for two adjacent peak hours of a typical peak time or busiest hour of record. However, since there are no accurate records from which to compute the busy-hour period, an estimate of the busy hour was developed based on total operations divided by 365 days, divided by 6 hours. From experience, this formula represents a close approximation of busy-hour activity for airports without a control tower or at airports with part-time towers. Table 6-8 describes the projected busy-hour relationship.

### 6.5.6 General Aviation Passengers

For planning purposes, it is necessary to estimate the number of enplaned passengers generated by air taxi and general aviation itinerant activity. This information is necessary to plan passenger accommodations. Planning at this stage is concerned primarily with general spatial relationships. The forecast of ridership values for general aviation aircraft was obtained from the statistical department of the Aircraft Owners and Pilots Association (AOPA), concerning those types of aircraft expected to operate at Avi Suquilla Airport. By applying the operational fleet mix (see Table 6-7) to projected itinerant departures, the forecast of annual itinerant enplaned passengers may be determined. Table 6-9 shows annual enplaned passenger levels for the 20-year period along with anticipated busy-hour activity.

Table 6-8. Projected Busy-Hour Operations--Avi Suquilla Airport

| Year | Total Annual Operations | Busy-Hour Operations |
|---|---|---|
| 1990 | 25,510 | 11.6 |
| 1995 | 28,755 | 13.1 |
| 2005 | 35,400 | 16.2 |

Source: RS&H, 1985.

Table 6-9. Projected Annual Enplaned Passengers and Busy-Hour Activity—Avi Suquilla Airport*

| Year | Annual Itinerant Departures | Passengers Per Itinerant Departure | Annual Itinerant Passengers Departing | Busy-Hour Itinerant Passengers Departing |
|---|---|---|---|---|
| 1990 | 7,360 | 2.4 | 17,664 | 8.1 |
| 1995 | 8,440 | 2.6 | 21,944 | 10.0 |
| 2005 | 10,725 | 2.8 | 30,030 | 13.7 |

* Based on annual itinerant passengers divided by 365 days, divided by 6 hours.

Sources: AOPA, 1985.
RS&H, 1985.

### 6.5.7 Instrument Operations and Approaches

An instrument operation is defined as an operation handled by an ATC facility for the aircraft arrival or departure at an airport on an IFR flight plan or for the provision of IFR separation. An instrument approach, however, is an IFR approach made under actual IFR weather conditions. A wind and weather analysis was developed based on information obtained from the University of Arizona and NOAA National Climatic Center records for Yuma Airport, Yuma Arizona, located 103 miles south-southwest of Avi Suquilla, and Luke Air Force Base, located 106 miles east-southeast of the Airport. The analysis determined that VFR weather occurs 99.6 percent of the time and IFR weather occurs 0.4 percent of the time in the Parker area. Annual instrument approaches at Avi Suquilla Airport were estimated by applying the IFR weather characteristics of the area to one-half the forecast of total annual operations. Instrument operations were estimated based on the assumption that approximately 2 percent of all arriving aircraft in any given year will use the published approach to assist in locating the airport or be used for instrument training and compliance with IFR proficiency requirements. Instrument operations and approaches are shown in Table 6-10.

### 6.5.8 Cargo

CRIT-Air handles small amounts of light cargo between Phoenix, Parker, and other points within the immediate southwest region, and the volume of cargo handled at present does not warrant any exclusive processing or holding accommodations. Although CRIT-Air has just recently begun an expanded cargo operation based in Phoenix, Arizona, the effects of this new operation are not expected to change any existing or future cargo handling requirements at Avi Suquilla Airport.

### 6.5.9 Consolidated Forecast

Table 6-11 shows the consolidated forecasts for Avi Suquilla Airport developed in this analysis. The total unconstrained forecast of aircraft movement for the proposed airport is expected to increase from

Table 6-10. Instrument Operations and Approaches--Avi Suquilla Airport

| Category | 1984 | 1990 | 1995 | 2005 |
|---|---|---|---|---|
| Instrument Operations* | 208 | 255 | 288 | 354 |
| Instrument Approaches† | 42 | 51 | 58 | 71 |

* Estimate based on 99.6-percent VFR, and 0.4-percent IFR and 45-percent instrument rated pilots in the region.
† Estimate based on the assumption that at least 20 percent of instrument operations would involve a descent to the airport under IFR conditions.

Sources: RS&H, 1985.
General Aviation Statistical Databook, GAMA, 1985.

Table 6-11. Consolidated Forecasts--Avi Suquilla Airport

| Activity | 1984 | 1990 | 1995 | 2005 |
|---|---|---|---|---|
| Based Aircraft: | | | | |
| Single-Engine | 30 | 36 | 38 | 45 |
| Multi-Engine | 3 | 3 | 3 | 4 |
| Turbo-prop | 0 | 1 | 2 | 3 |
| Turbojet | 0 | 0 | 1 | 2 |
| Rotor | 1 | 1 | 2 | 2 |
| TOTAL | 34 | 41 | 46 | 56 |
| Enplaned Passengers Departing: | 10,673 | 24,818 | 30,218 | 40,810 |
| Itinerant Operations: | 11,870 | 14,720 | 16,880 | 21,450 |
| Local Operations: | 8,955 | 10,790 | 11,875 | 13,950 |
| Total Operations: | 20,825 | 25,510 | 28,755 | 35,400 |
| Operations by Aircraft Type:* | | | | |
| Class A | 19,724 | 23,895 | 26,652 | 32,292 |
| Class B | 1,101 | 1,610 | 2,088 | 3,088 |
| Class C | 0 | 5 | 15 | 20 |
| Class D | 0 | 0 | 0 | 0 |
| TOTAL | 20,825 | 25,510 | 28,755 | 35,400 |
| Instrument Operations: | 208 | 255 | 288 | 354 |
| Instrument Approaches: | 42 | 51 | 58 | 71 |

*Class Definitions:
Class A - Single-engine 12,500 pounds or less maximum certified takeoff weight (MCTW).
Class B - Multi-engine 12,500 pounds or less (MCTW).
Class C - Large multi-engine (12,500 to 300,000 pounds MCTW).
Class D - Heavy multi-engine (300,000 pounds MCTW or more).

Sources: AC 5060-5 Capacity Planning Manual.
RS&H, 1985.

20,825 operations initially to 35,400 annual operations by the year 2005, showing a growth factor of nearly 70 percent over the planning period. The forecasts developed as a result of this analysis will be used as the basis for determining future facility requirements for Avi Suquilla Airport.